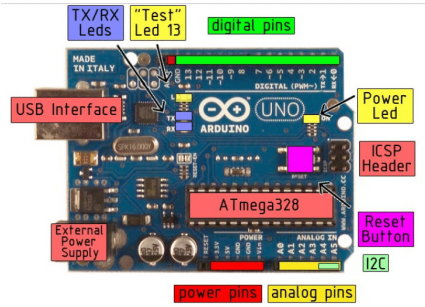
Experiment -1: Study of Arduino-UNO Board

Theory:



Power USB

Arduino board can be powered by using the USB cable from your computer. All you need to do is connect the USB cable to the USB connection.

Arduino Reset

You can reset your Arduino board, i.e., start your program from the beginning. You can reset the UNO board in two ways. First, by using the reset button on the board. Second, you can connect an external reset button to the Arduino pin labelled RESET

Pins (3.3, 5, GND, V_{in})

- 3.3V − Supply 3.3 output volt
- 5V − Supply 5 output volt
- GND – There are several GND pins on the Arduino, any of which can be used to ground your circuit.
- V_{in} – This pin also can be used to power the Arduino board from an external power source, like AC mains power supply.

Analog pins

The Arduino UNO board has six analog input pins A0 through A5. These pins can read the analog signals.

Digital I/O

The Arduino UNO board has 14 digital I/O pins. These pins can be configured to work as input digital pins to read logic values (0 or 1) or as digital output

Main microcontroller

Each Arduino board has its own microcontroller. [Brain of the board]

Power LED indicator

This LED should light up when you plug your Arduino into a power source to indicate that your board is powered up correctly.

TX and RX LEDs

The TX led flashes with different speed while sending the serial data. RX flashes during the receiving process.

Precautions:

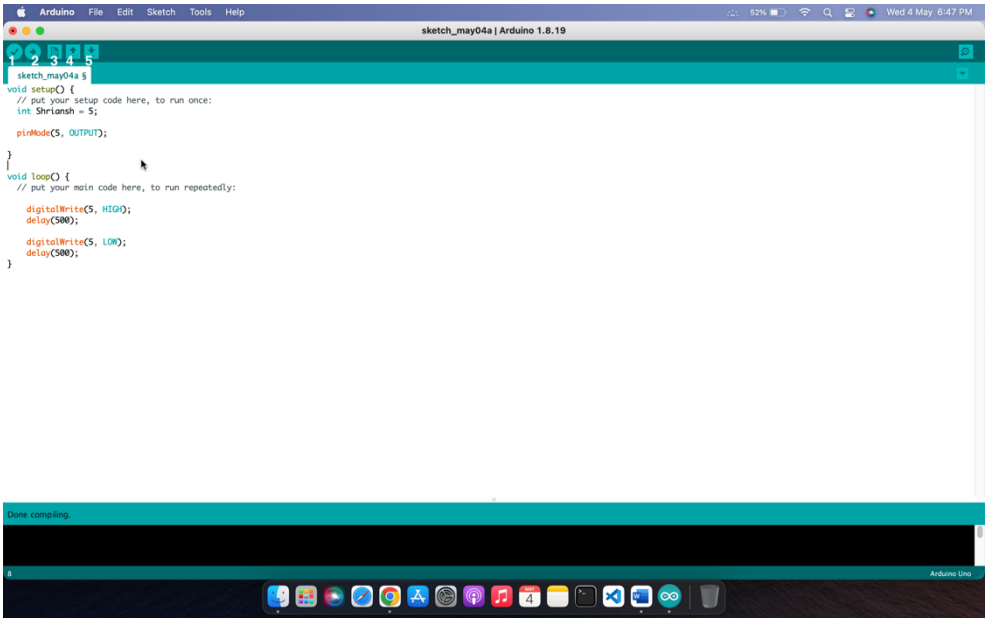
- Double check the polarities of any connections you make.
- Give Recommended Power Supply, Don’t go beyond a certain limit.

Experiment -2: Arduino IDE Software

Theory:

The open-source Arduino Software (IDE) makes it easy to write code and upload it to the board. This software can be used with any Arduino board

- Download the Arduino IDE on website : https://www.arduino.cc/en/software for your Operating System.
- Install it on the system.
- The Window will open like Image 1, Write Some code on the window.



Here, the Buttons on the top are for:

1: Verify/Compiling of Code

2: Uploading of Code

3: New File

4: Open File

5: Save File

Experiment -3: LED Blinking

Requirements:

- Breadboard
- Arduino Uno
- 1 LED
- 1 Resistor
- Jumper Wires

Theory:

CODE:

```
int ShrianshLED = 2;

void setup()
{
  pinMode(ShrianshLED, OUTPUT);
}

void loop()
{
  digitalWrite(ShrianshLED, HIGH);
   delay(1000);

   digitalWrite(ShrianshLED, LOW);
   delay(1000);
}
```

Precautions:

- Don’t Forget to add a resistor in series with LED to avoid burning of LED.

Experiment -4: IR Sensor Interfacing

Requirements:

- Breadboard
- Arduino Uno
- 1 LED
- 1 IR-Sensor
- 1 Resistor
- Jumper Wires

Theory:

CODE:

```
int ShrianshLED = 5;
int Sensor = 2;

void setup()
{
  pinMode(ShrianshLED, OUTPUT);

  pinMode(Sensor, INPUT);
}

void loop()
{
     int Pikachu = digitalRead(Sensor);

     if(Pikachu == 1)
     {
          digitalWrite(ShrianshLED, HIGH);
     }
```

```
    else
    {
        digitalWrite(ShrianshLED,LOW);
    }
}
```

Precautions:

- Don’t Forget to add a resistor in series with LED to avoid burning of LED.
- Write the correct pin number and check the pin-mode to avoid any error.

Experiment -5: Home Automation

Requirements:

- Breadboard
- Arduino Uno
- 3 * LED
- 1 * Alarm

Theory:

CODE:

```
int ledMom = 5;
int ledWife = 3;
int ledDadi = 7;
int alarm = 2;

int sensorMilk = 8;
int sensorVeg = 11;

void setup()
{
    pinMode(ledMom, OUTPUT);
    pinMode(ledWife, OUTPUT);
    pinMode(ledDadi, OUTPUT);
    pinMode(alarm, OUTPUT);

    pinMode(sensorVeg, INPUT);
    pinMode(sensorMilk, INPUT);
}
```

```
void loop()
{
    int catcherOne = digitalRead(sensorVeg);
    int catcherTwo = digitalRead(sensorMilk);

    if(catcherOne == 1)
    {
        digitalWrite(ledMom, HIGH);
        digitalWrite(ledWife, HIGH);
        digitalWrite(ledDadi, HIGH);
        digitalWrite(alarm, LOW);
    }
    else if(catcherTwo == 1)
    {
        digitalWrite(ledMom, LOW);
        digitalWrite(ledWife, LOW);
        digitalWrite(ledDadi, LOW);
        digitalWrite(alarm, HIGH);
    }
    else{
        digitalWrite(ledMom, LOW);
        digitalWrite(ledWife, LOW);
        digitalWrite(ledDadi, LOW);
        digitalWrite(alarm, LOW);
    }

}
```

Precautions:

- Don’t Forget to add a resistor in series with LED to avoid burning of LED.
- Write the correct pin number and check the pin-mode for all I/O devices to avoid any error.